Fig. 1

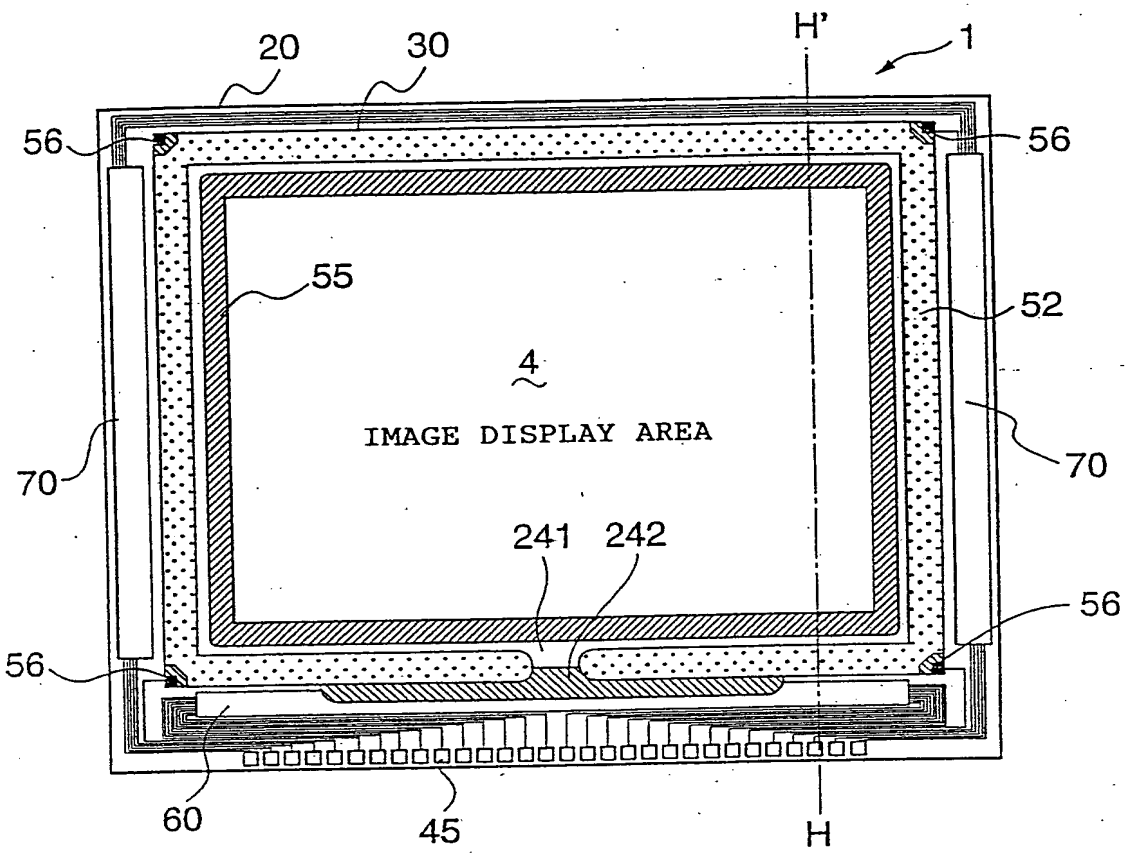

H'
1
20
30
56
56
55
52
4
IMAGE DISPLAY AREA
70
70
241
242
56
56
60
45
H

Fig. 2

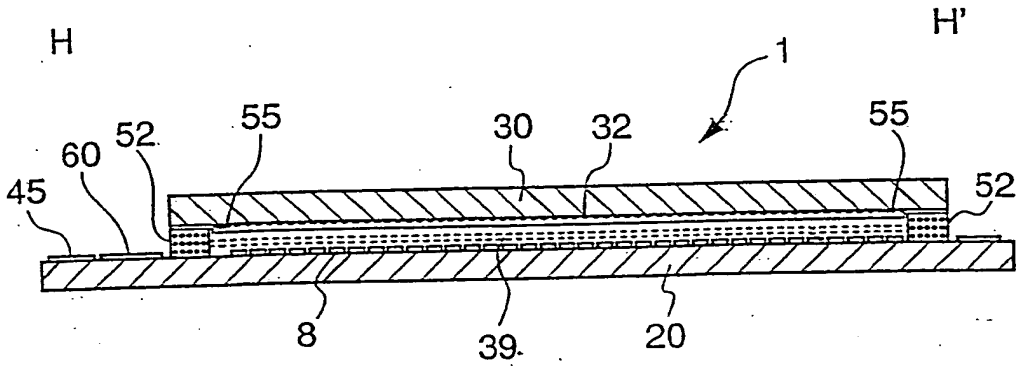


Fig. 3

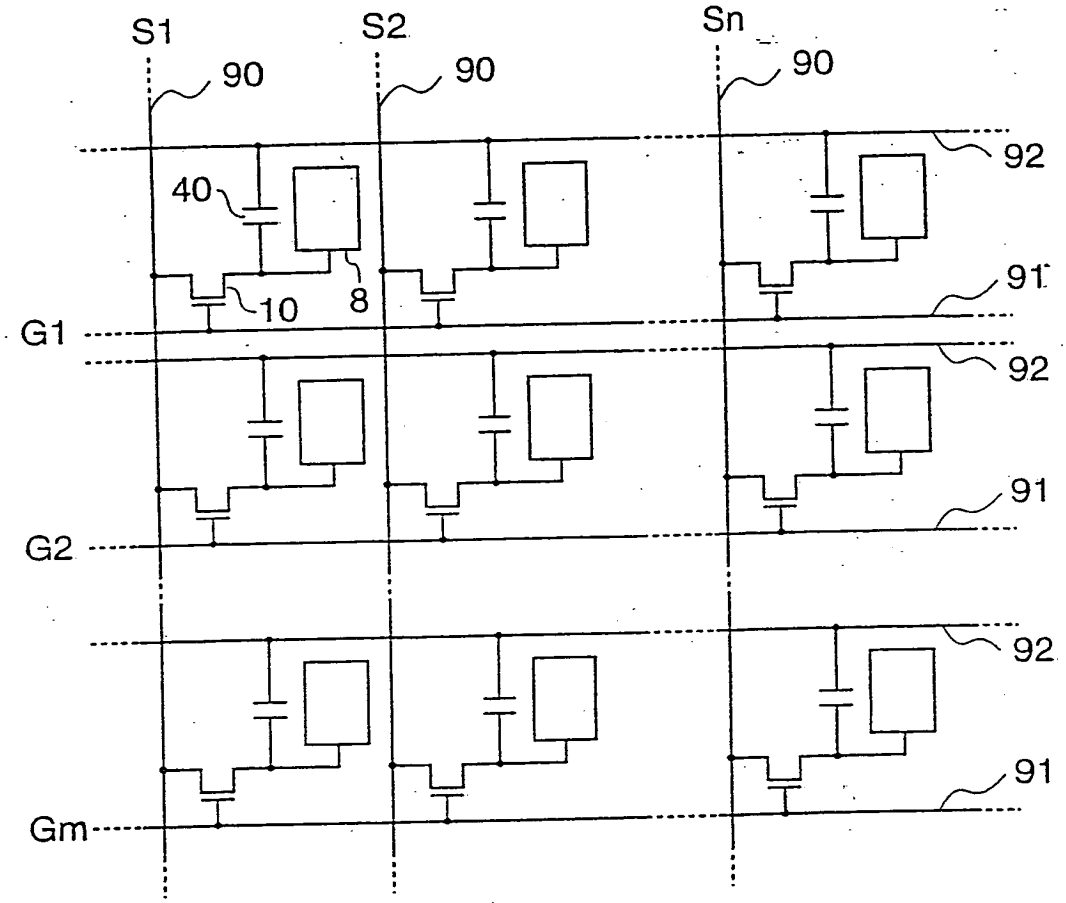


Fig. 4

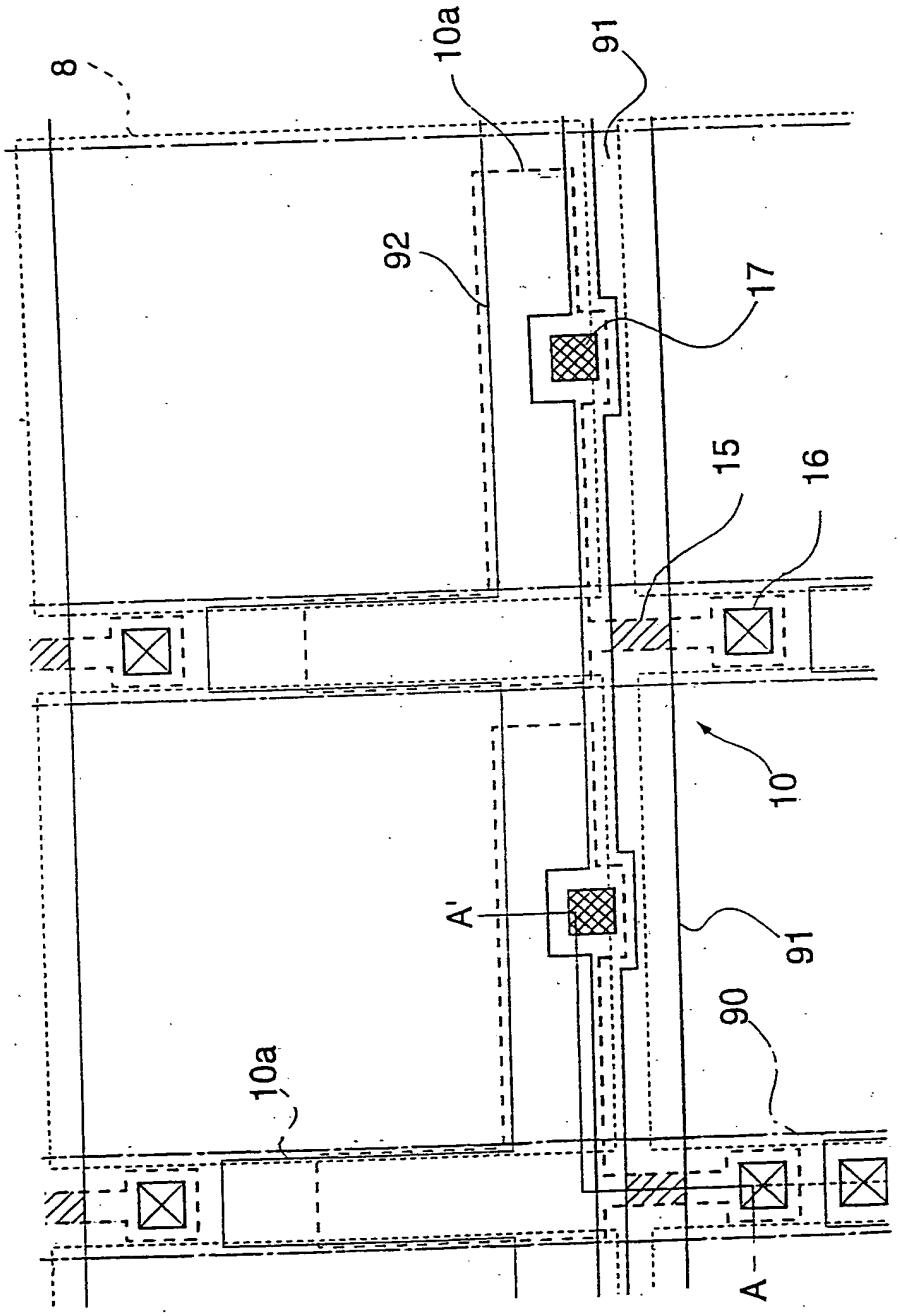


Fig. 5

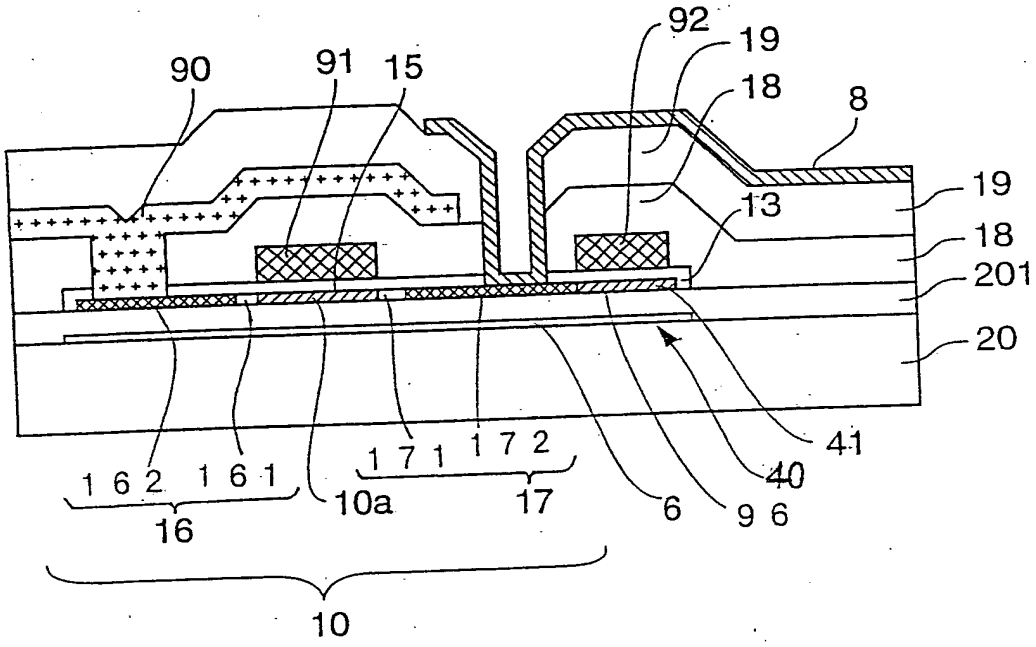

92
19
90
91
15
18
8
19
13
18
201
20
41
40
162
161
171
172
10a
17
6
96
16
10

Fig. 6

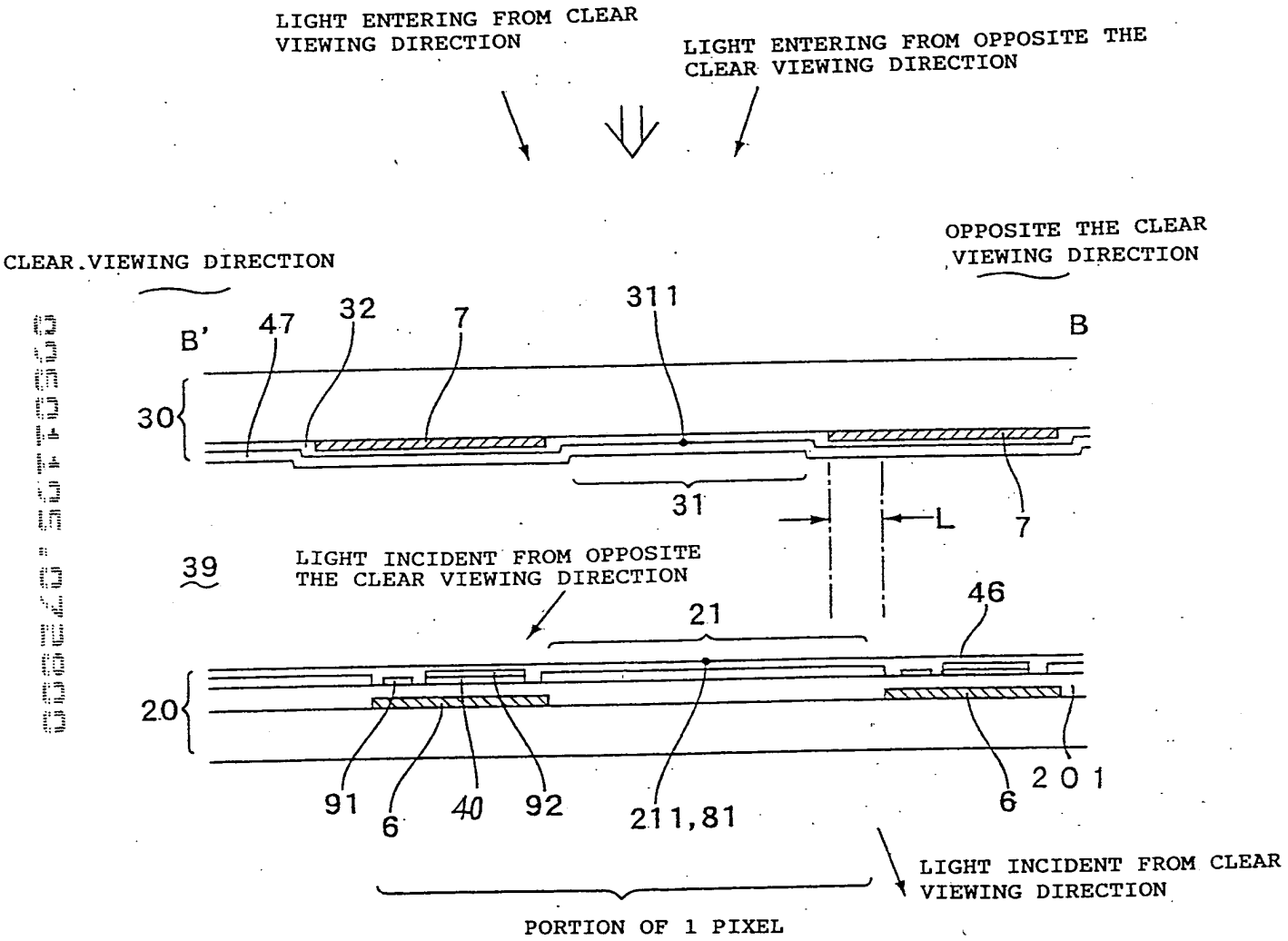

LIGHT ENTERING FROM CLEAR VIEWING DIRECTION
LIGHT ENTERING FROM OPPOSITE THE CLEAR VIEWING DIRECTION
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
B'
47
32
7
311
B
30
31
L
7
39
LIGHT INCIDENT FROM OPPOSITE THE CLEAR VIEWING DIRECTION
21
46
20
91
6
40
92
211,81
6
201
LIGHT INCIDENT FROM CLEAR VIEWING DIRECTION
PORTION OF 1 PIXEL

Fig. 7

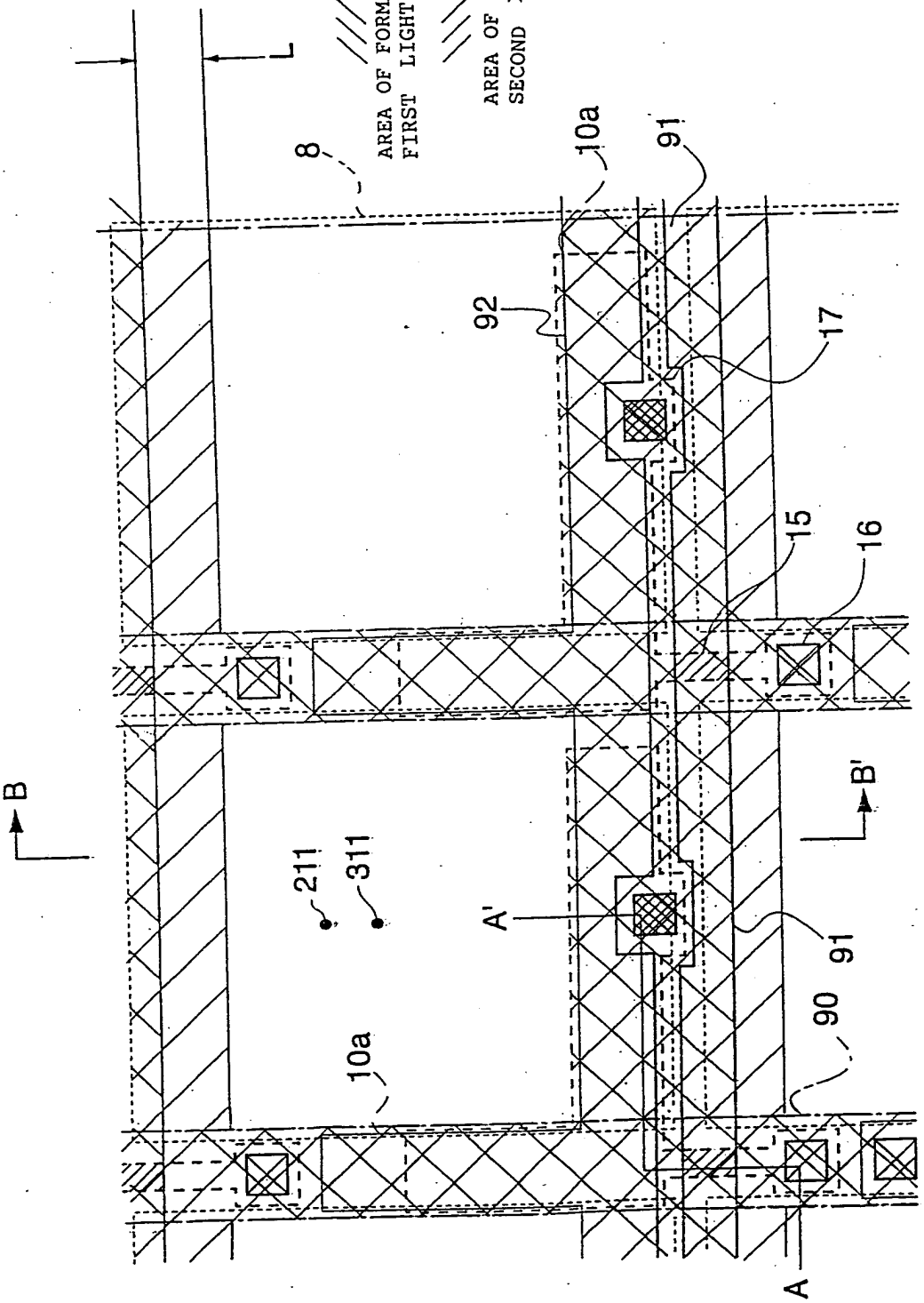

AREA OF FORMATION OF FIRST LIGHT-SHIELDING FILM 6
AREA OF FORMATION OF SECOND LIGHT-SHIELDING FILM 7
L
8
10a
91
92
17
15
16
B
B'
211
311
A'
91
10a
90
A
OPPOSITE THE CLEAR VIEWING DIRECTION
CLEAR VIEWING DIRECTION

Fig. 8

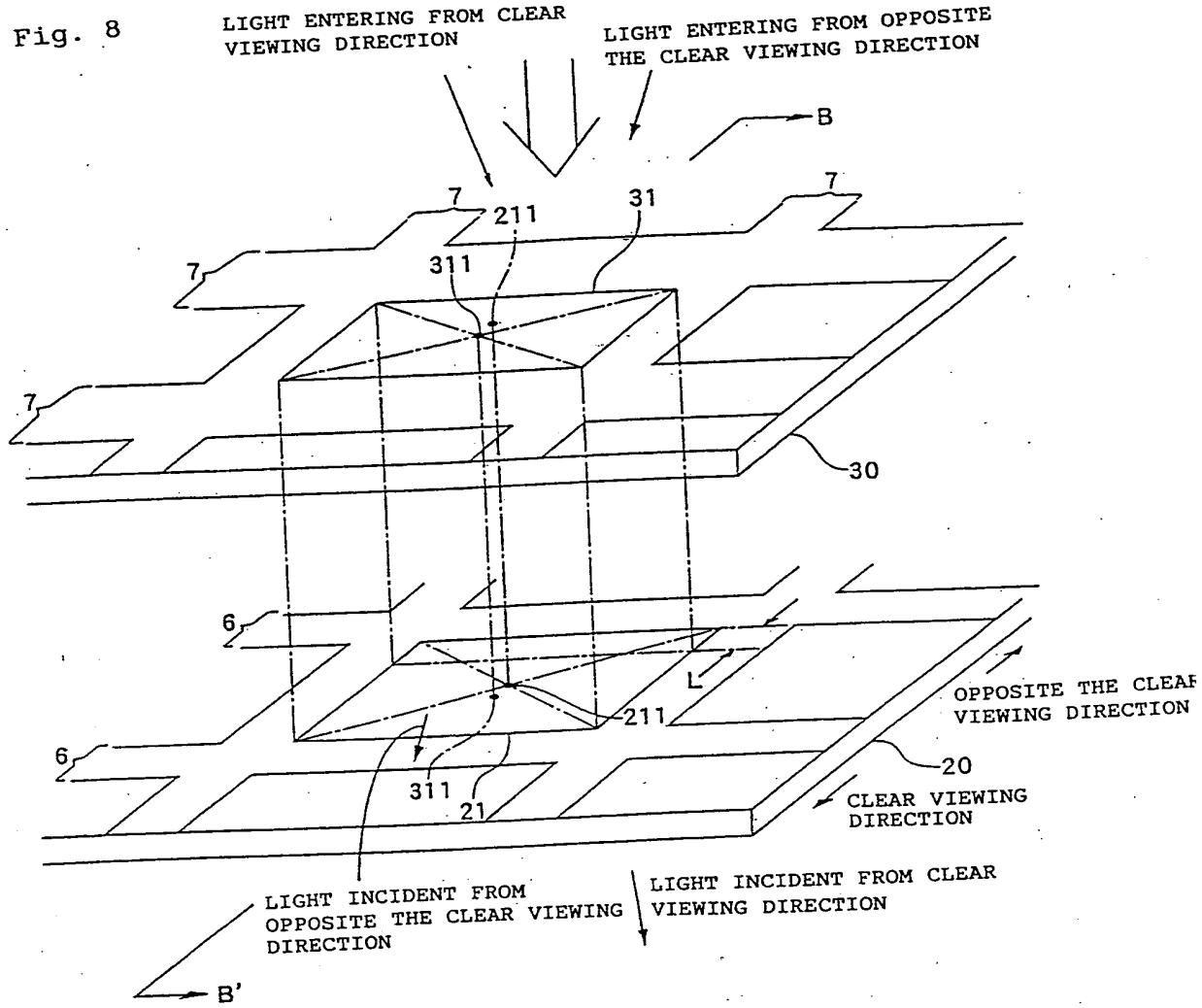

LIGHT ENTERING FROM CLEAR VIEWING DIRECTION
LIGHT ENTERING FROM OPPOSITE THE CLEAR VIEWING DIRECTION
B
7
211
31
311
30
6
L
OPPOSITE THE CLEAR VIEWING DIRECTION
20
21
CLEAR VIEWING DIRECTION
LIGHT INCIDENT FROM OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT FROM CLEAR VIEWING DIRECTION
B'

Fig. 9

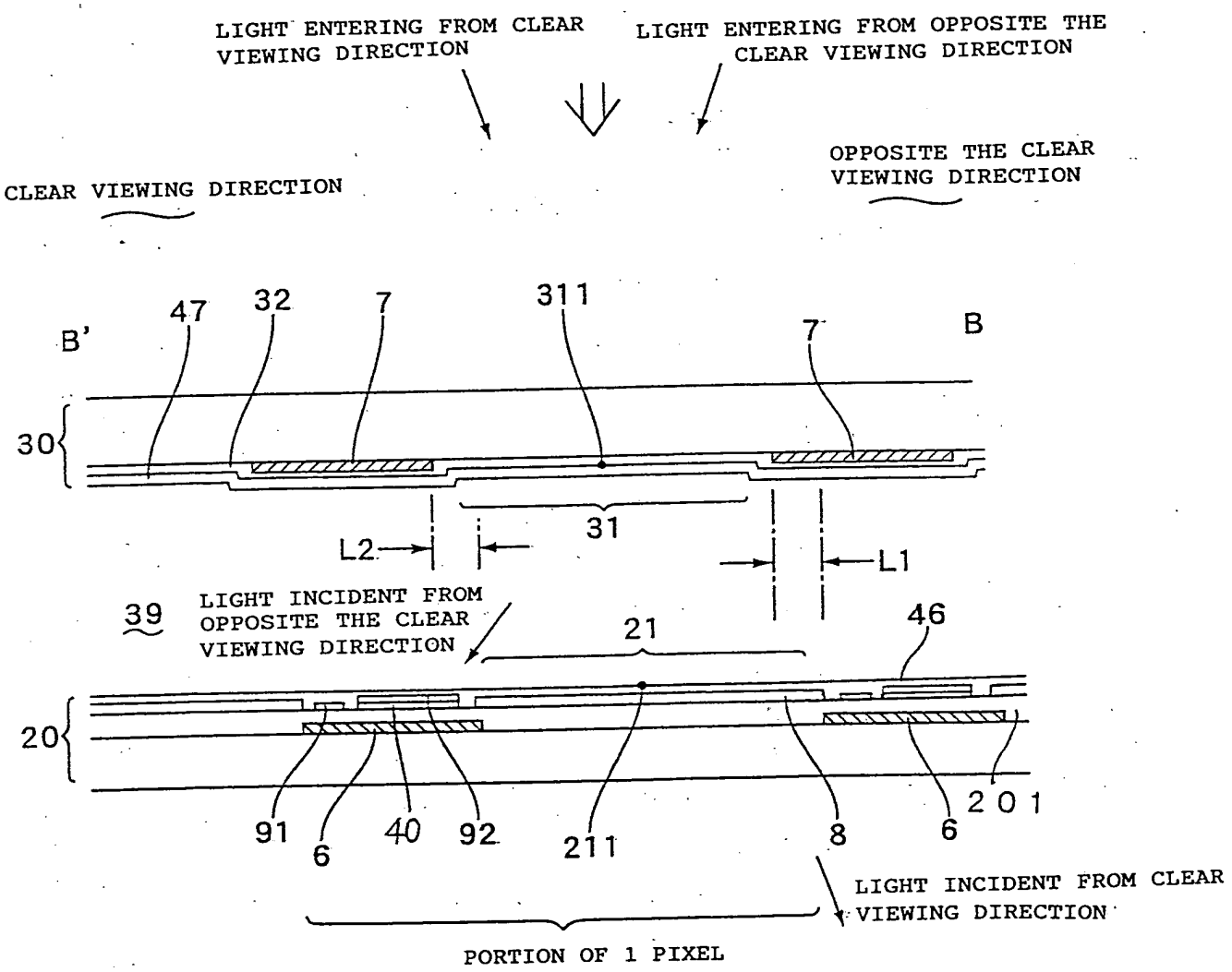

LIGHT ENTERING FROM CLEAR VIEWING DIRECTION
LIGHT ENTERING FROM OPPOSITE THE CLEAR VIEWING DIRECTION
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
B'
47
32
7
311
7
B
30
31
L2
L1
39
LIGHT INCIDENT FROM OPPOSITE THE CLEAR VIEWING DIRECTION
21
46
20
91
6
40
92
211
8
6
201
LIGHT INCIDENT FROM CLEAR VIEWING DIRECTION
PORTION OF 1 PIXEL

Fig. 10

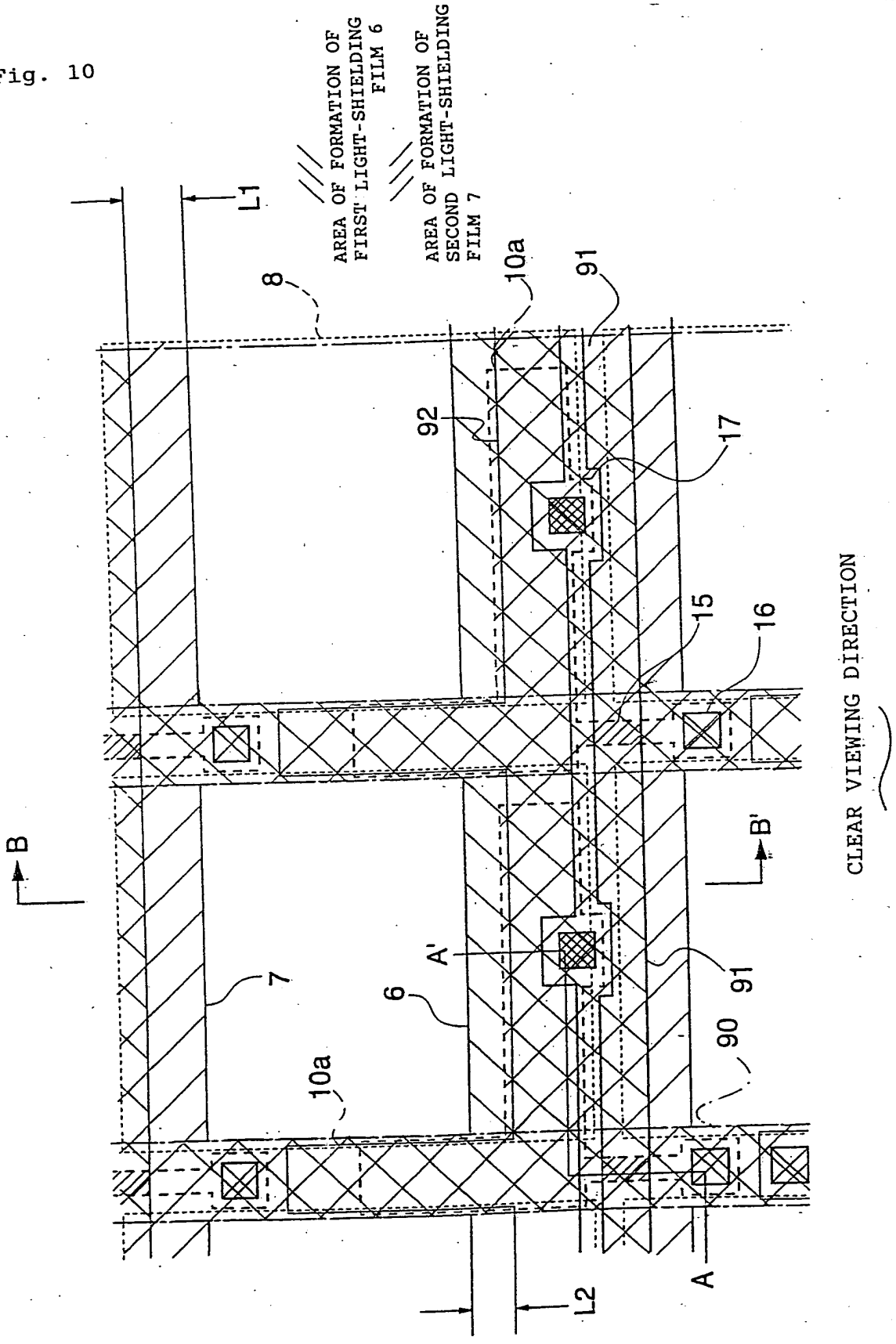

AREA OF FORMATION OF FIRST LIGHT-SHIELDING FILM 6
AREA OF FORMATION OF SECOND LIGHT-SHIELDING FILM 7
L1
L2
8
10a
91
92
17
15
16
B
B'
A
A'
7
6
90
OPPOSITE THE CLEAR VIEWING DIRECTION
CLEAR VIEWING DIRECTION

Fig. 11

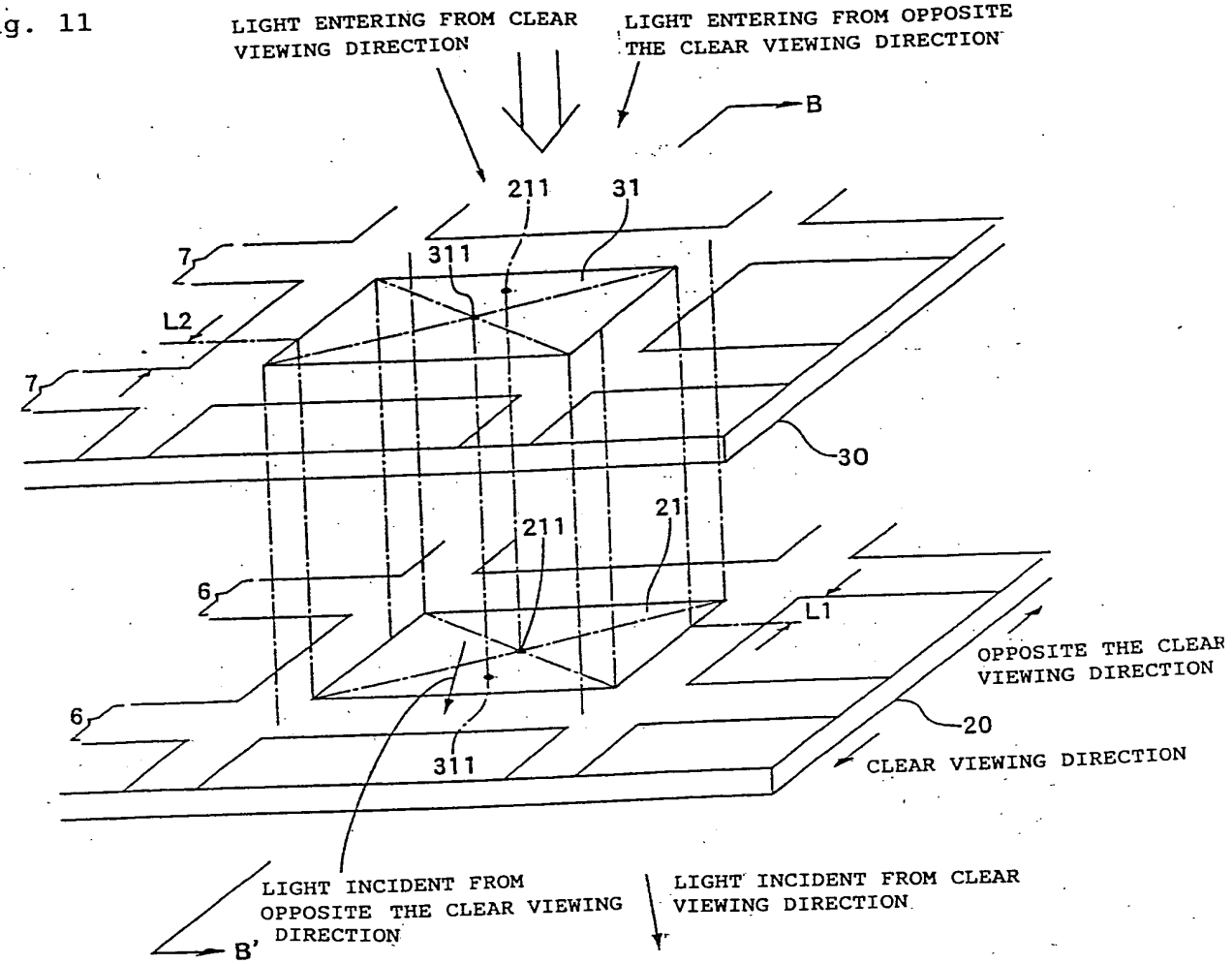

LIGHT ENTERING FROM CLEAR VIEWING DIRECTION
LIGHT ENTERING FROM OPPOSITE THE CLEAR VIEWING DIRECTION
B
211
31
311
7
L2
7
30
211
21
6
L1
OPPOSITE THE CLEAR VIEWING DIRECTION
6
20
311
CLEAR VIEWING DIRECTION
LIGHT INCIDENT FROM OPPOSITE THE CLEAR VIEWING DIRECTION
B'
LIGHT INCIDENT FROM CLEAR VIEWING DIRECTION

Fig. 12

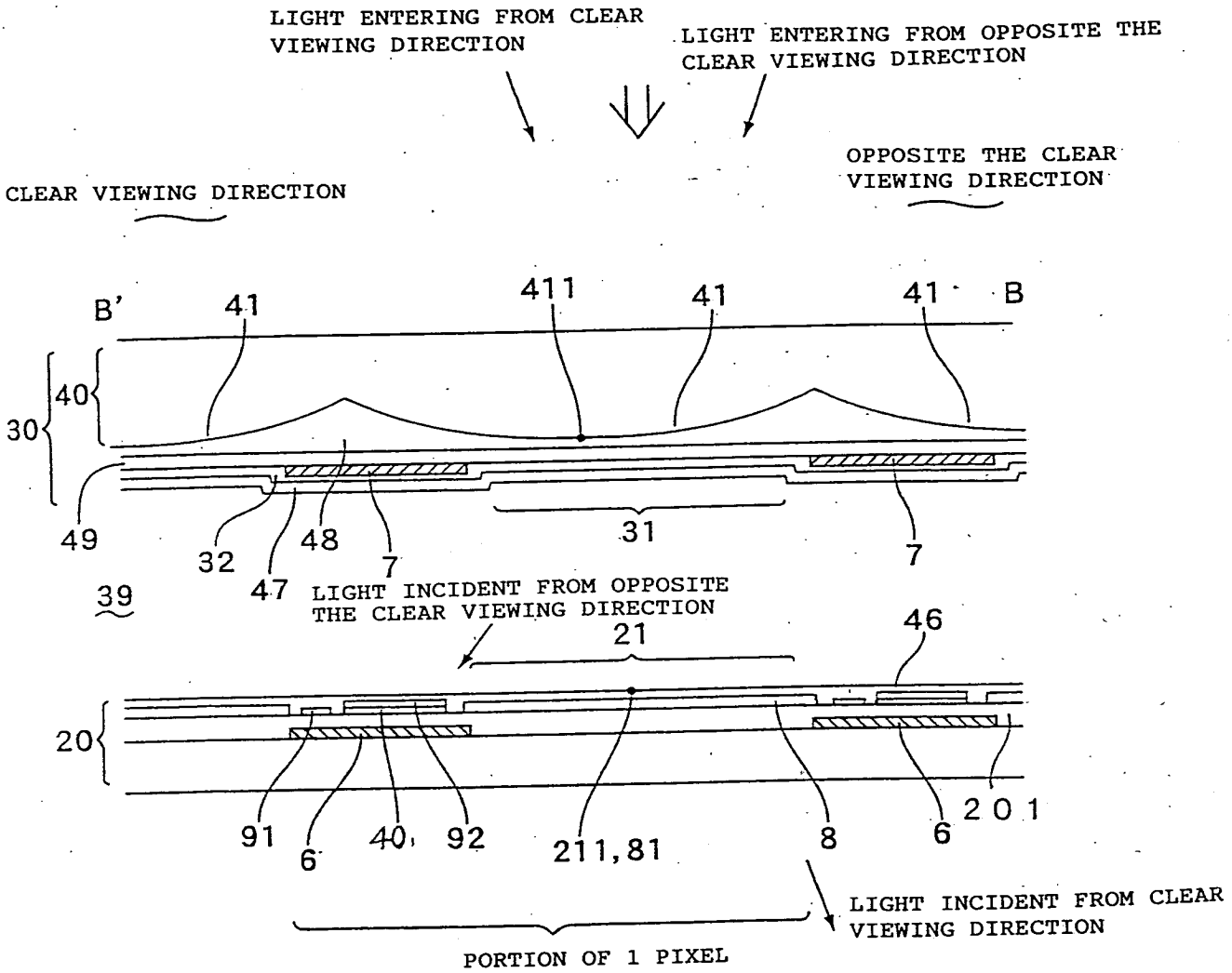

LIGHT ENTERING FROM CLEAR VIEWING DIRECTION
LIGHT ENTERING FROM OPPOSITE THE CLEAR VIEWING DIRECTION
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
B'
41
411
41
41
B
40
30
49
32
47
48
7
31
7
39
LIGHT INCIDENT FROM OPPOSITE THE CLEAR VIEWING DIRECTION
21
46
20
91
6
40
92
211,81
8
6
201
LIGHT INCIDENT FROM CLEAR VIEWING DIRECTION
PORTION OF 1 PIXEL

Fig. 13

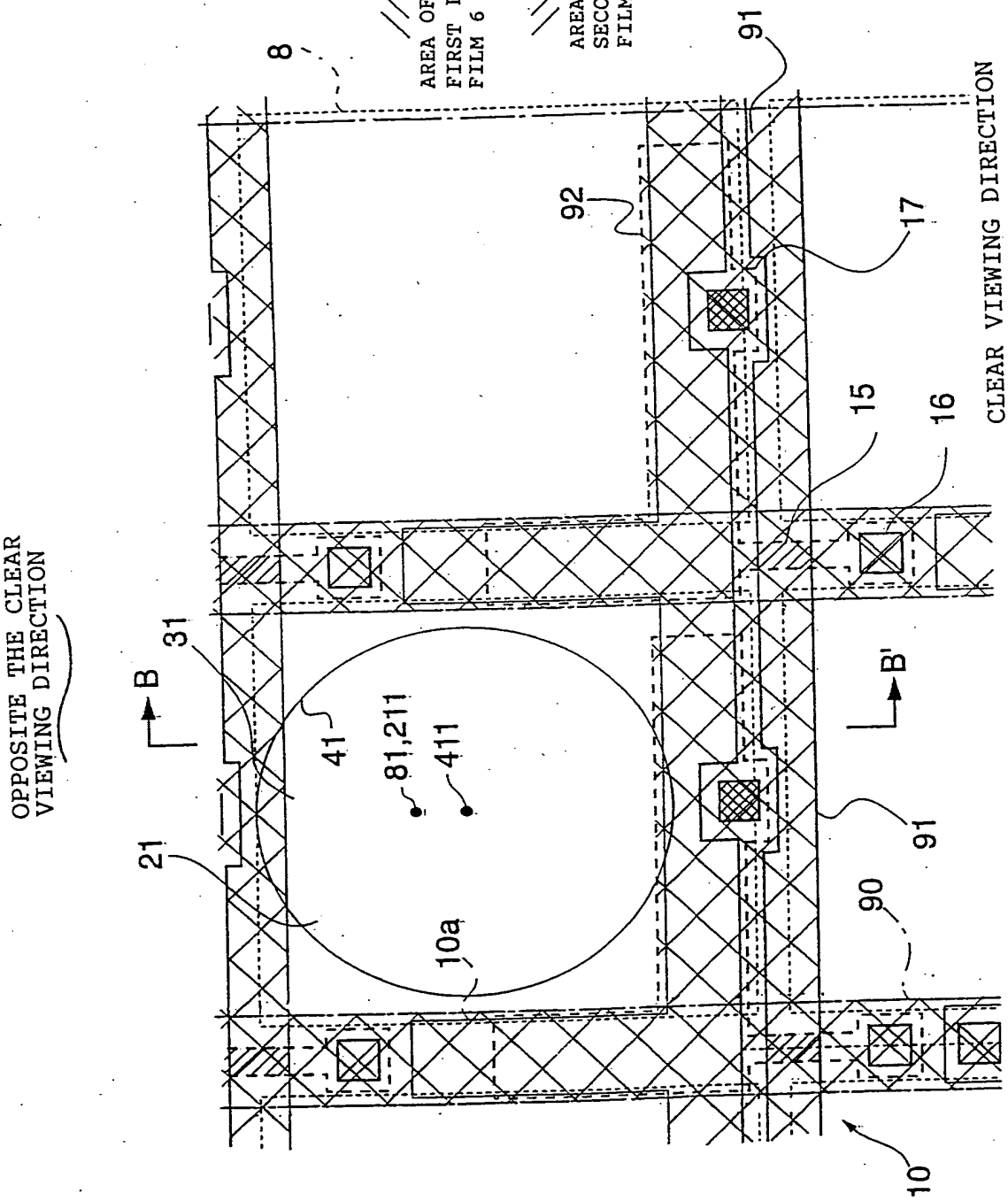

AREA OF FORMATION OF FIRST LIGHT-SHIELDING FILM 6
AREA OF FORMATION OF SECOND LIGHT-SHIELDING FILM 7
8
91
92
17
CLEAR VIEWING DIRECTION
15
16
OPPOSITE THE CLEAR VIEWING DIRECTION
B
31
B'
41
81,211
411
21
91
10a
90
10

Fig. 14

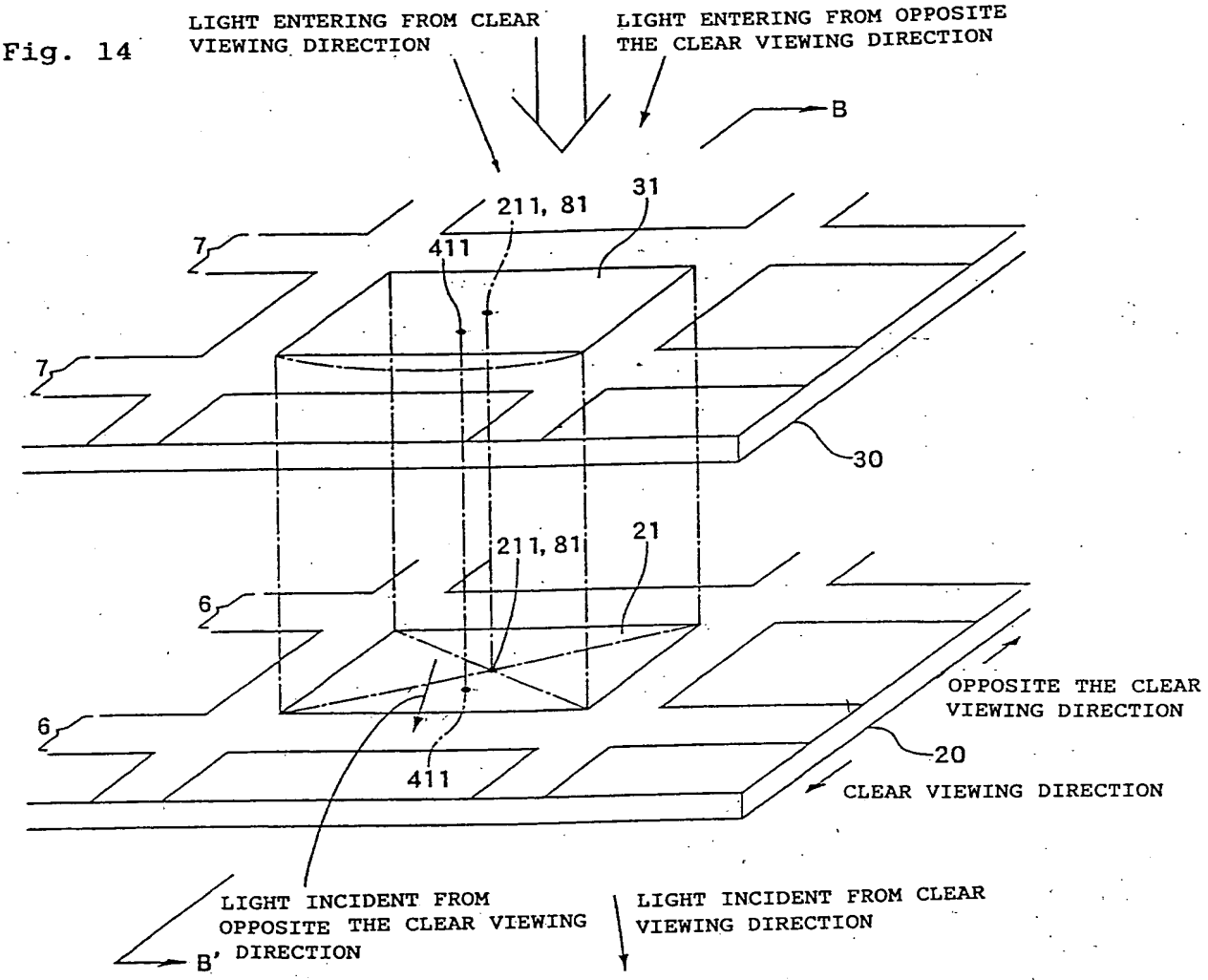

LIGHT ENTERING FROM CLEAR VIEWING DIRECTION
LIGHT ENTERING FROM OPPOSITE THE CLEAR VIEWING DIRECTION
B
211, 81
31
411
7
7
30
211, 81
21
6
6
411
OPPOSITE THE CLEAR VIEWING DIRECTION
20
CLEAR VIEWING DIRECTION
LIGHT INCIDENT FROM OPPOSITE THE CLEAR VIEWING DIRECTION
B'
LIGHT INCIDENT FROM CLEAR VIEWING DIRECTION

Fig. 15

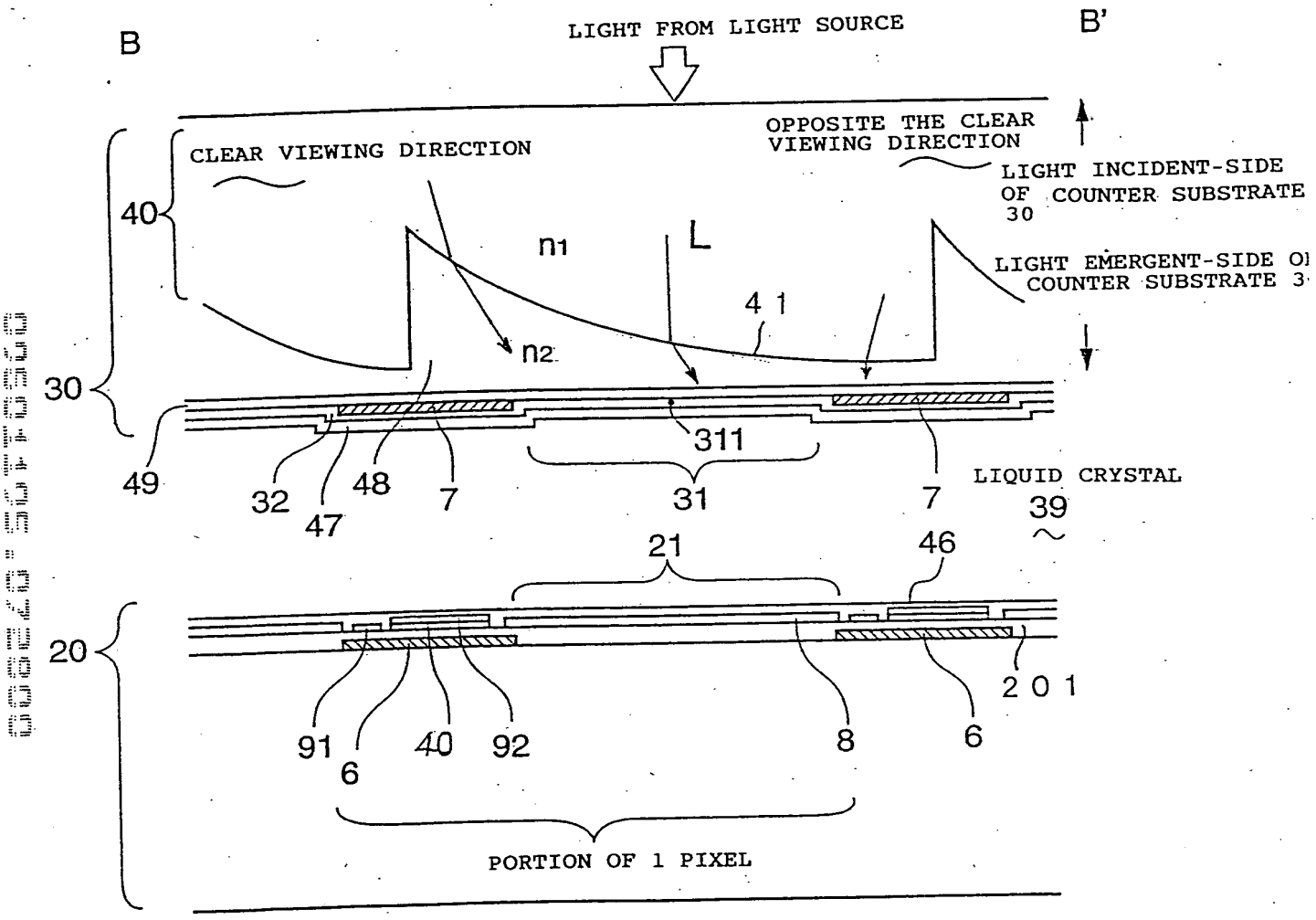

B
B'
LIGHT FROM LIGHT SOURCE
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT-SIDE OF COUNTER SUBSTRATE 30
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 3
40
n1
L
41
n2
30
311
49
32
47
48
7
31
7
LIQUID CRYSTAL
39
21
46
20
201
91
6
40
92
8
6
PORTION OF 1 PIXEL

Fig. 16

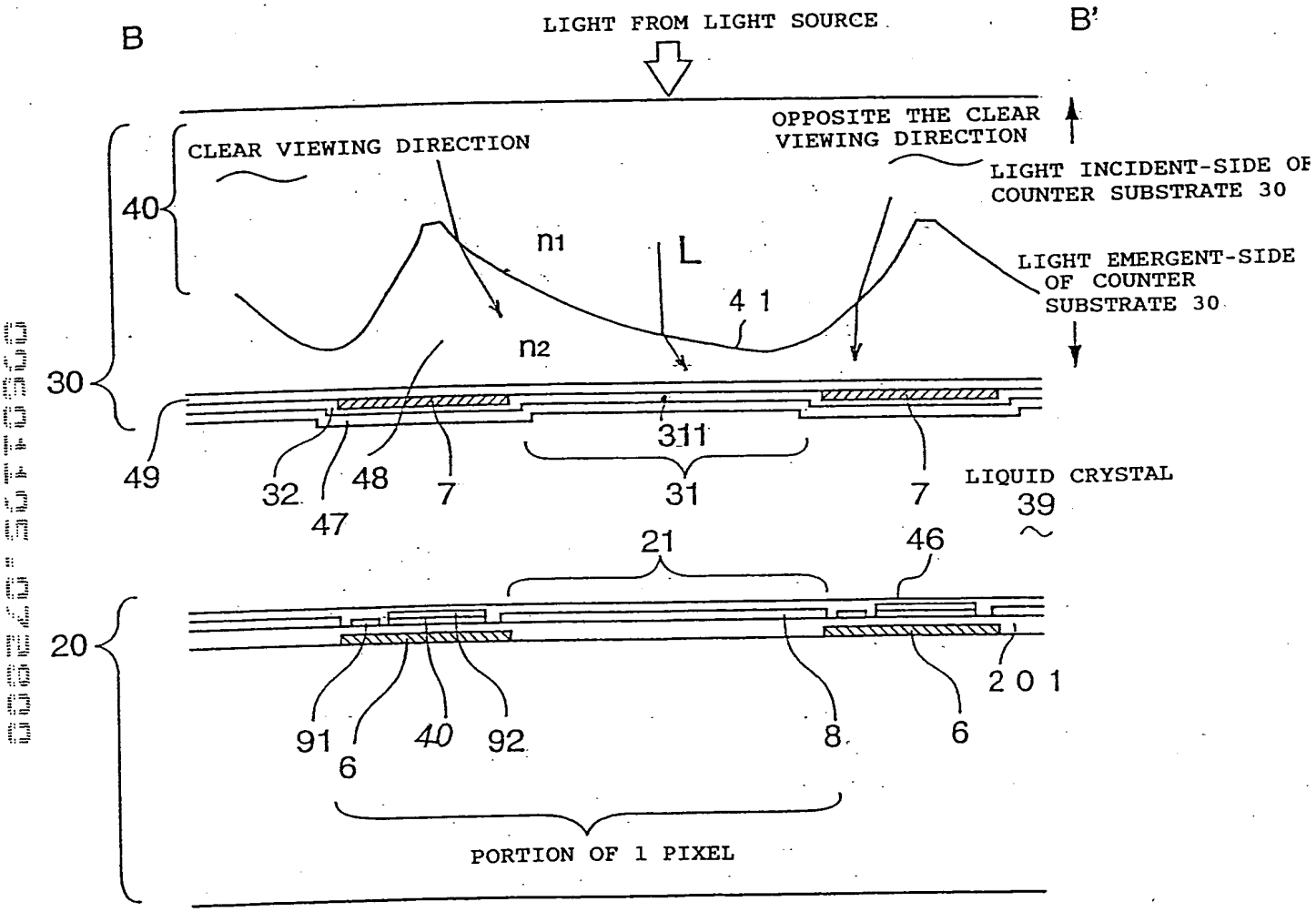

B
B'
LIGHT FROM LIGHT SOURCE
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT-SIDE OF COUNTER SUBSTRATE 30
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 30
40
n1
L
41
n2
30
49
32
47
48
7
311
31
7
LIQUID CRYSTAL
39
21
46
20
91
6
40
92
8
6
201
PORTION OF 1 PIXEL

Fig. 17

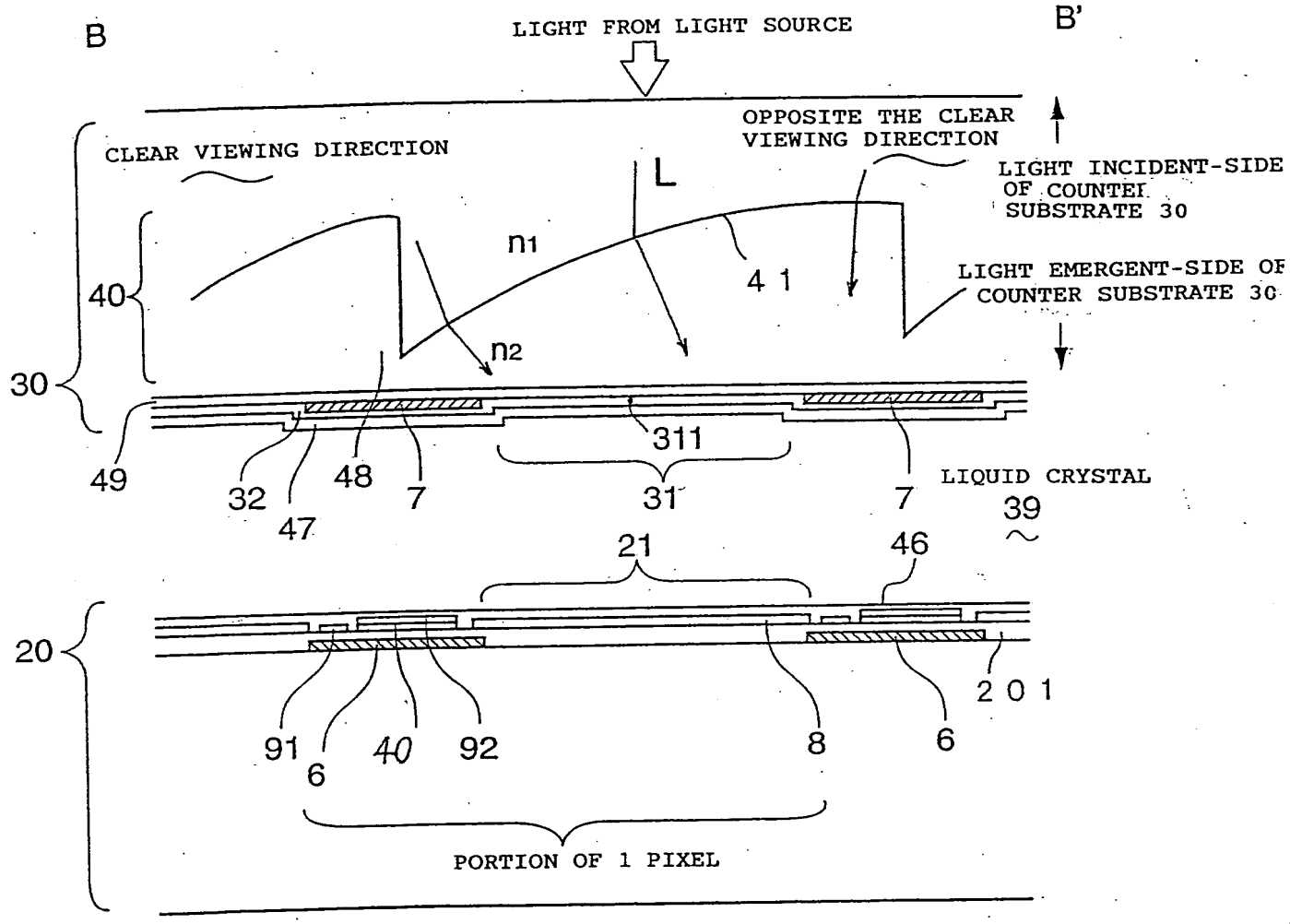

B
B'
LIGHT FROM LIGHT SOURCE
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT-SIDE OF COUNTER SUBSTRATE 30
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 30
L
n1
n2
40
41
30
49
32
47
48
7
311
31
7
LIQUID CRYSTAL
39
21
46
20
91
6
40
92
8
6
201
PORTION OF 1 PIXEL

Fig. 18

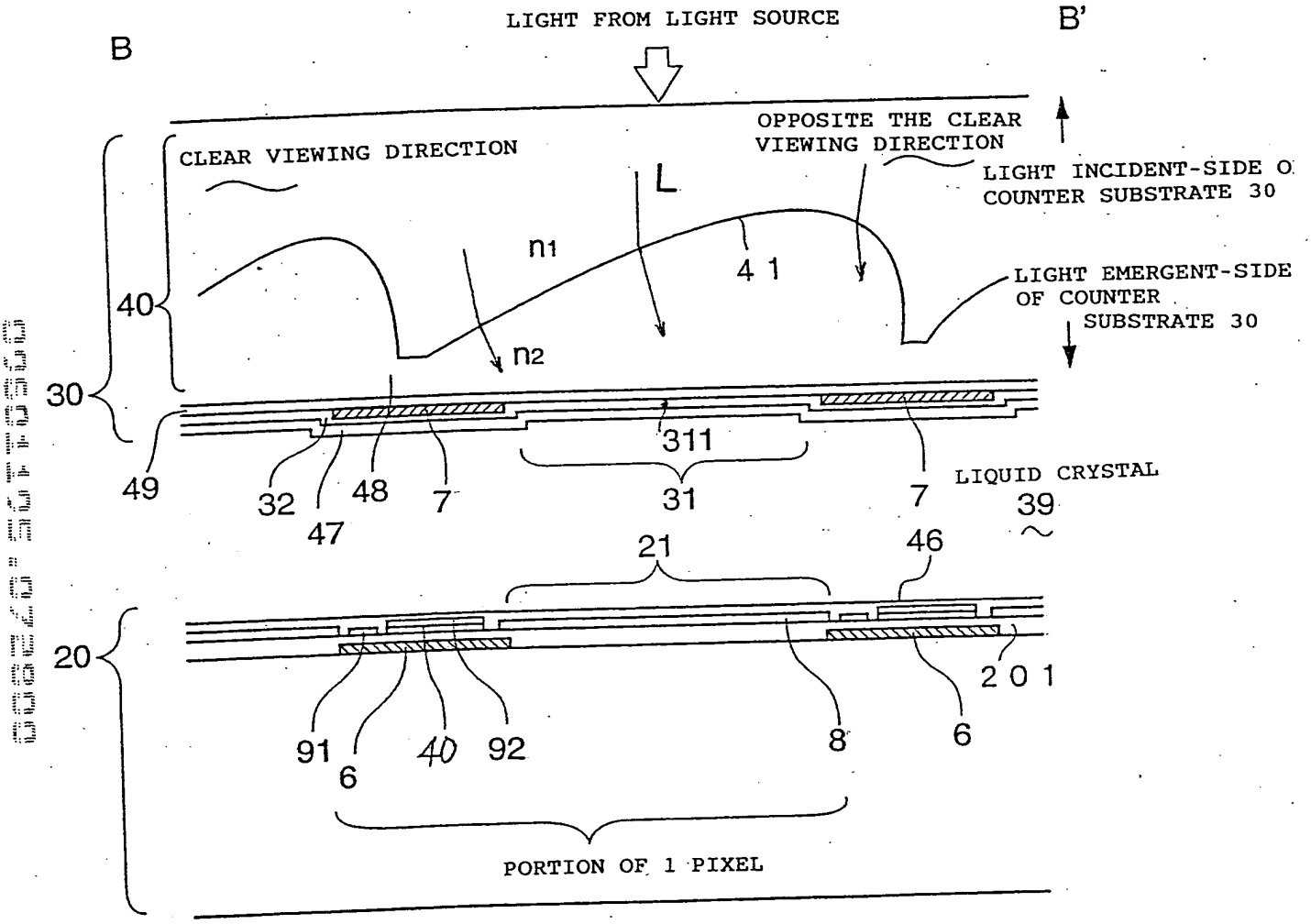

LIGHT FROM LIGHT SOURCE
B
B'
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT-SIDE O
COUNTER SUBSTRATE 30
L
n1
n2
41
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 30
40
30
311
49
32
47
48
7
31
7
LIQUID CRYSTAL
39
21
46
20
201
91
6
40
92
8
6
PORTION OF 1 PIXEL

Fig. 19

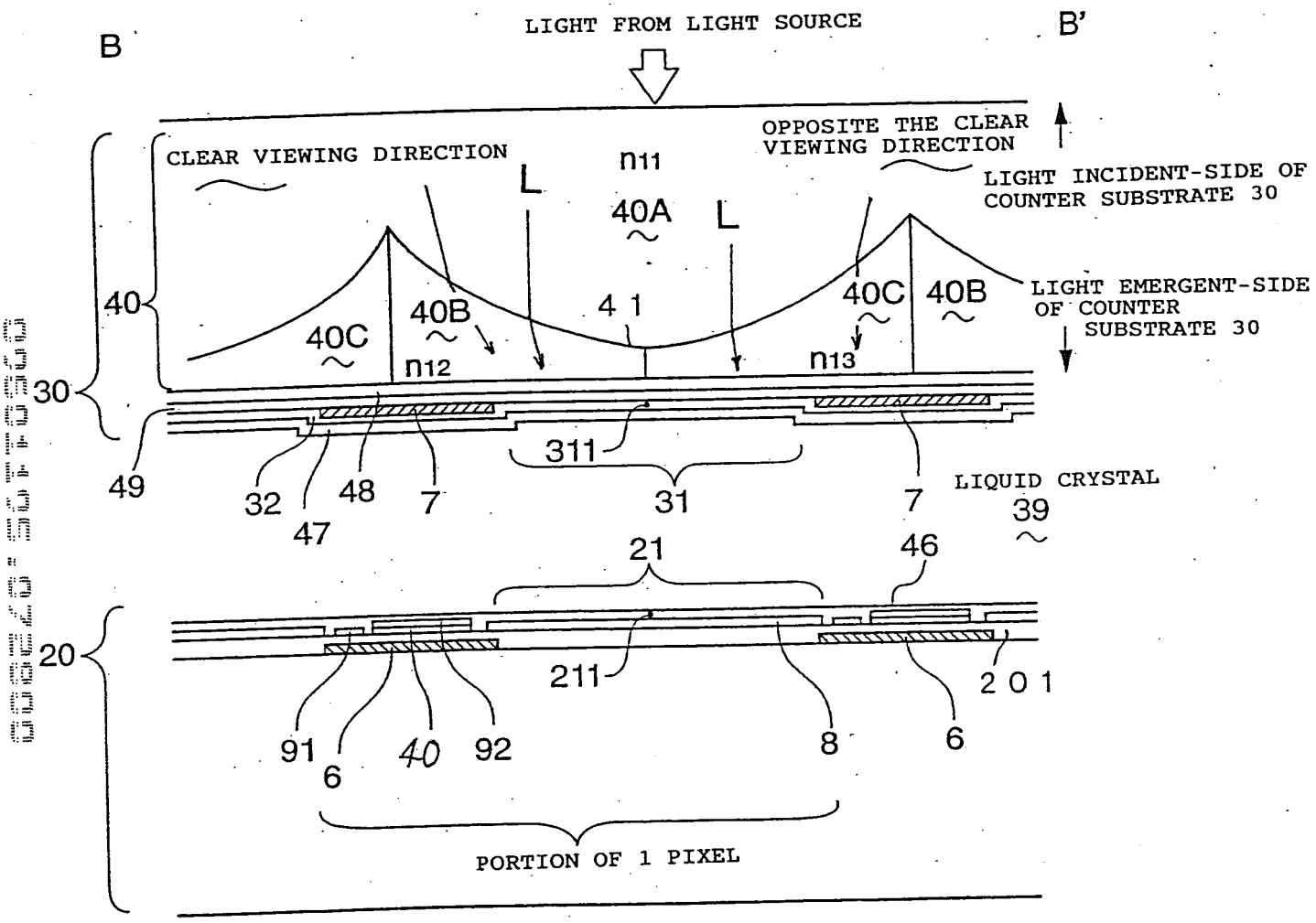

B
B'
LIGHT FROM LIGHT SOURCE
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT-SIDE OF COUNTER SUBSTRATE 30
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 30
n11
L
40A
L
40
40C
40B
41
40C
40B
n12
n13
30
49
32
47
48
7
311
31
7
LIQUID CRYSTAL
39
21
46
20
211
201
91
6
40
92
8
6
PORTION OF 1 PIXEL

Fig. 20

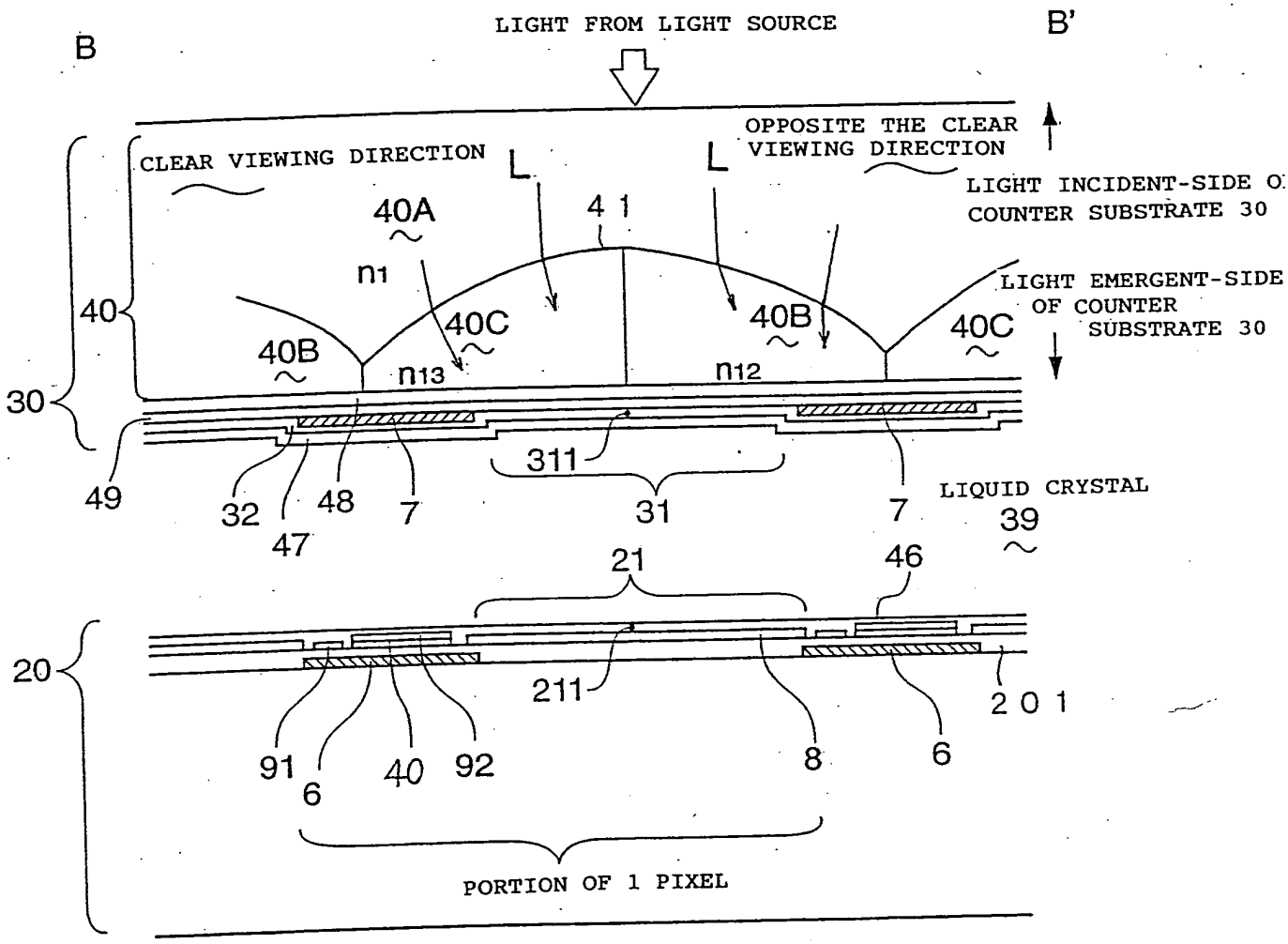

B
B'
LIGHT FROM LIGHT SOURCE
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
L
L
LIGHT INCIDENT-SIDE O
COUNTER SUBSTRATE 30
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 30
40A
41
n1
40
40B
40C
40B
40C
n13
n12
30
49
32
47
48
7
311
31
7
LIQUID CRYSTAL
39
21
46
20
211
201
91
6
40
92
8
6
PORTION OF 1 PIXEL

Fig. 21

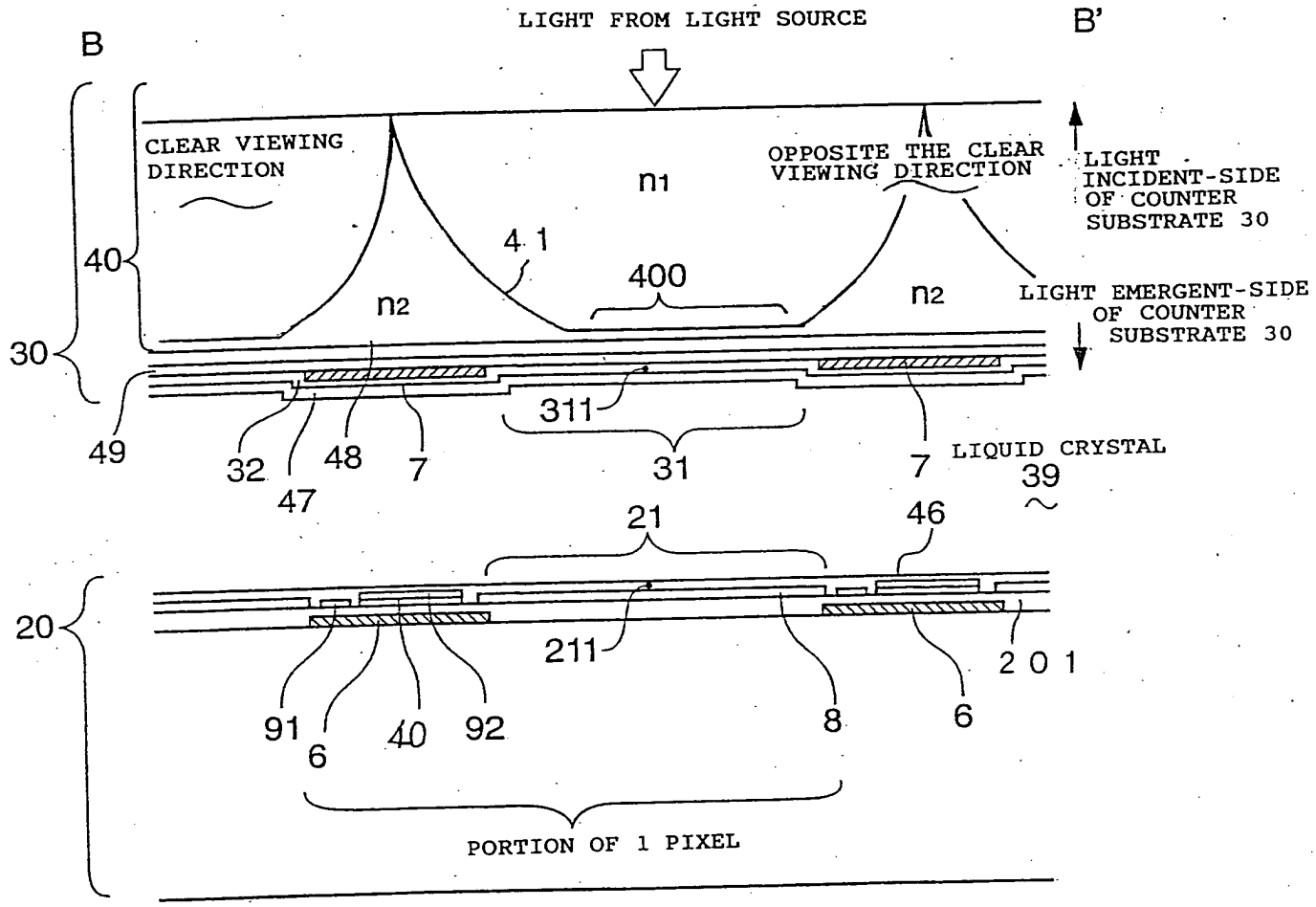

LIGHT FROM LIGHT SOURCE
B
B'
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT-SIDE OF COUNTER SUBSTRATE 30
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 30
n1
n2
n2
41
400
40
30
49
32
47
48
7
311
31
7
LIQUID CRYSTAL
39
21
46
20
211
201
91
6
40
92
8
6
PORTION OF 1 PIXEL

Fig. 22

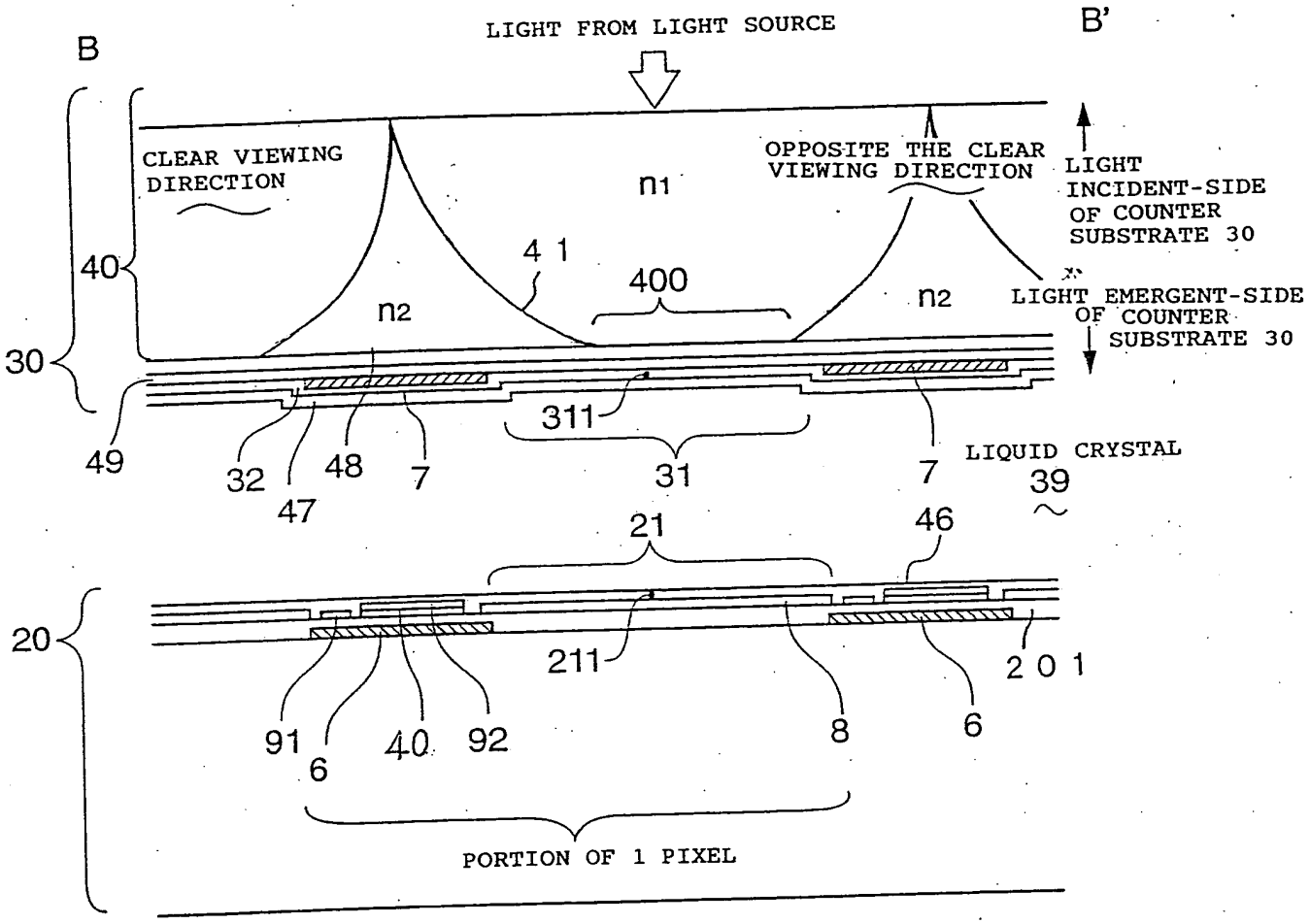

B
B'
LIGHT FROM LIGHT SOURCE
CLEAR VIEWING DIRECTION
OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT-SIDE OF COUNTER SUBSTRATE 30
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 30
n1
n2
n2
40
41
400
30
311
49
32
47
48
7
31
7
LIQUID CRYSTAL
39
21
46
20
211
201
91
6
40
92
8
6
PORTION OF 1 PIXEL

Fig. 23

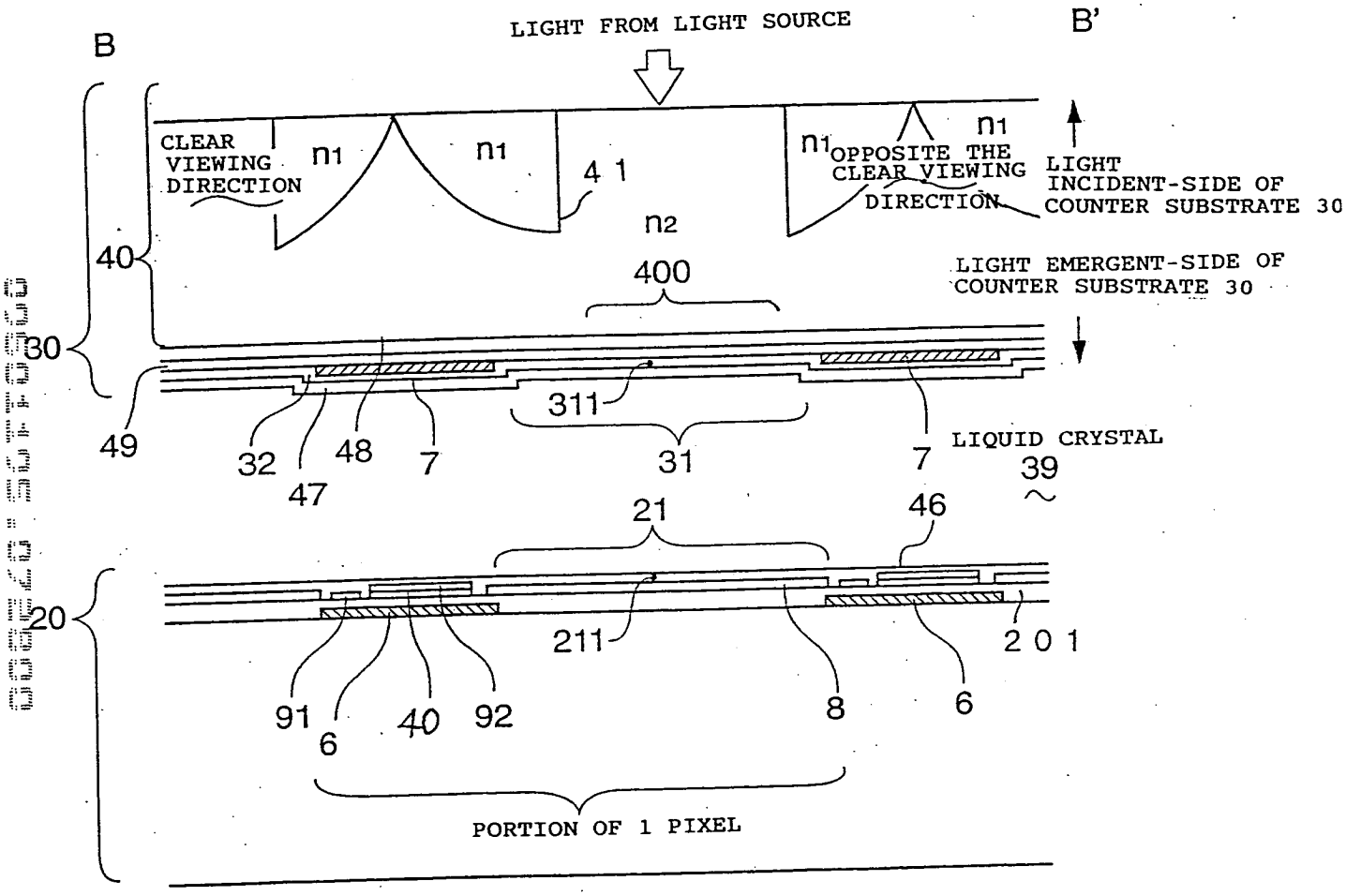

B
B'
LIGHT FROM LIGHT SOURCE
CLEAR VIEWING DIRECTION
n1
n1
41
n2
n1
n1
OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT-SIDE OF COUNTER SUBSTRATE 30
LIGHT EMERGENT-SIDE OF COUNTER SUBSTRATE 30
40
400
30
311
49
32
47
48
7
31
7
LIQUID CRYSTAL
39
21
46
20
211
201
91
6
40
92
8
6
PORTION OF 1 PIXEL

Fig. 24

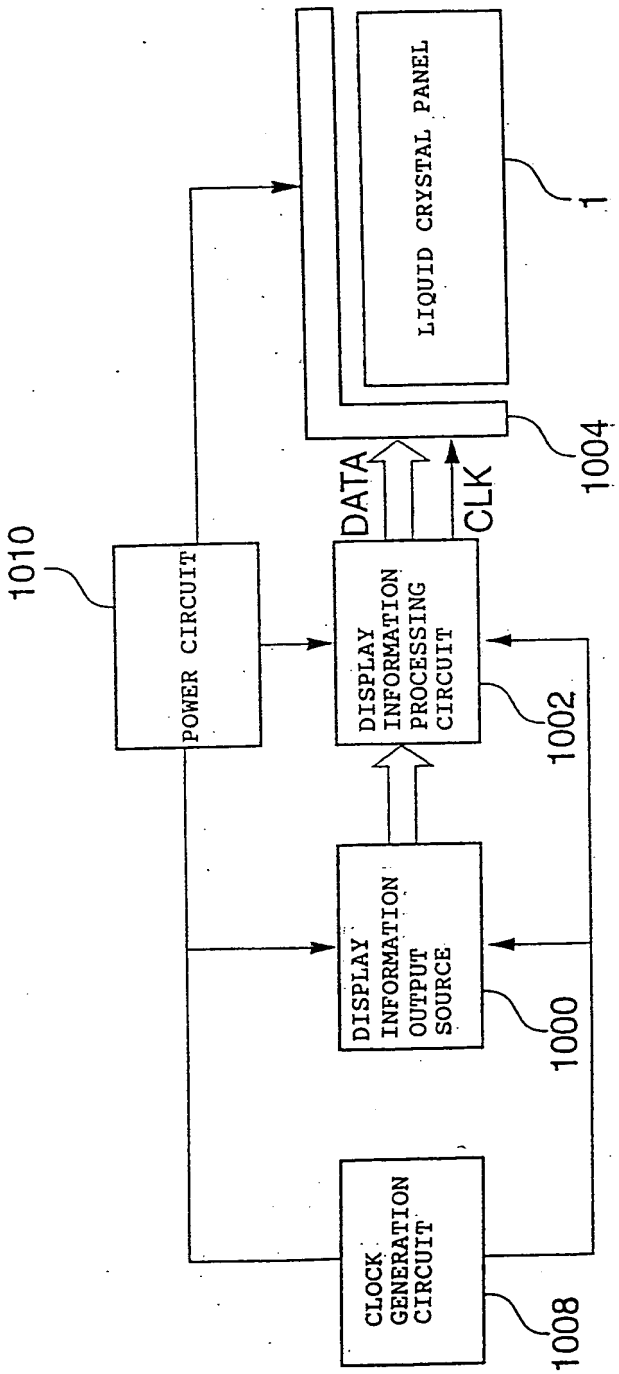

LIQUID CRYSTAL PANEL
1
1004
DATA
CLK
1010
POWER CIRCUIT
DISPLAY INFORMATION PROCESSING CIRCUIT
1002
DISPLAY INFORMATION OUTPUT SOURCE
1000
CLOCK GENERATION CIRCUIT
1008

Fig. 25

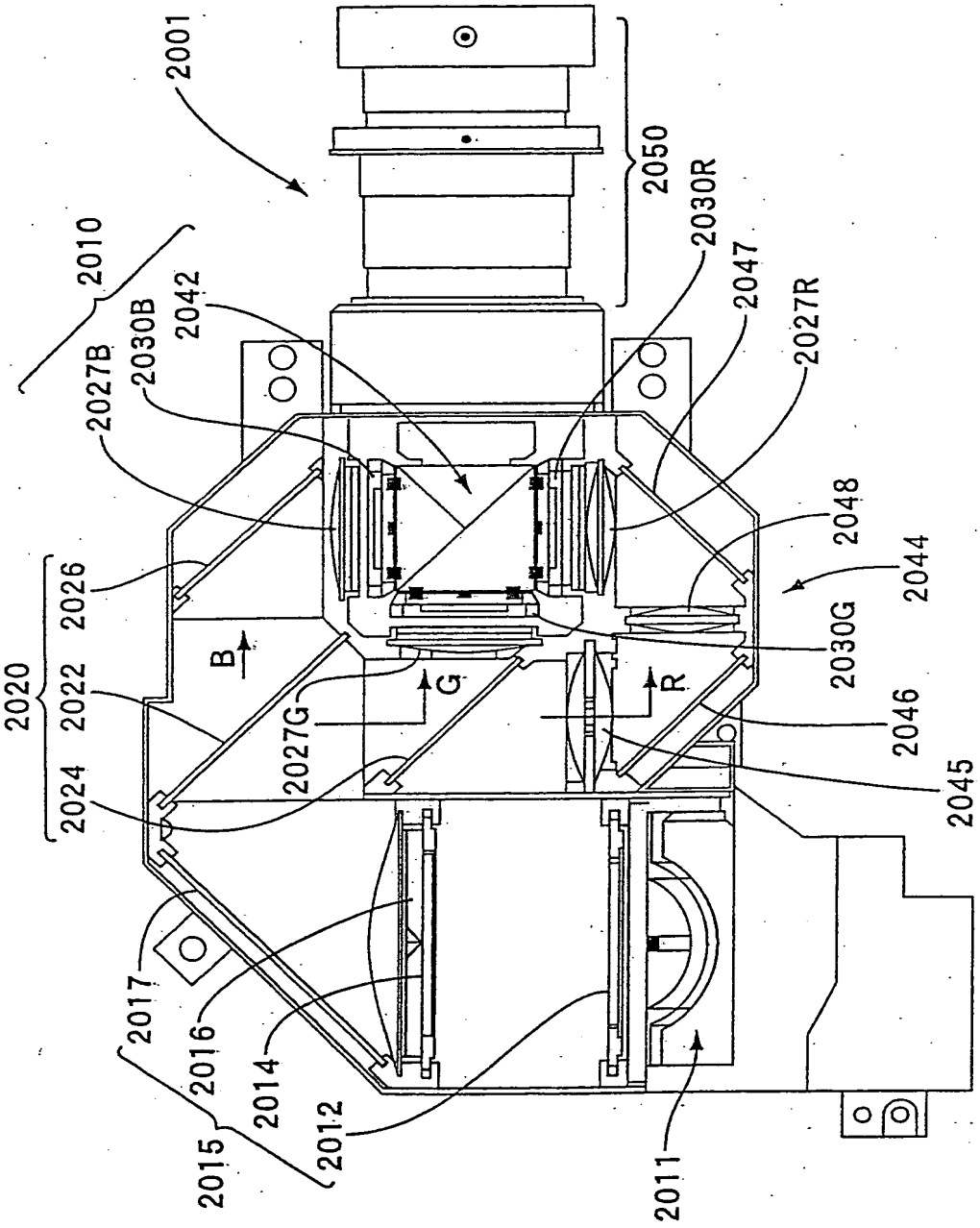

2001
2050
2030R
2047
2027R
2010
2042
2030B
2027B
2048
2044
2026
2020
2022
2024
B
G
R
2027G
2030G
2046
2045
2017
2016
2014
2012
2015
2011

Fig. 26

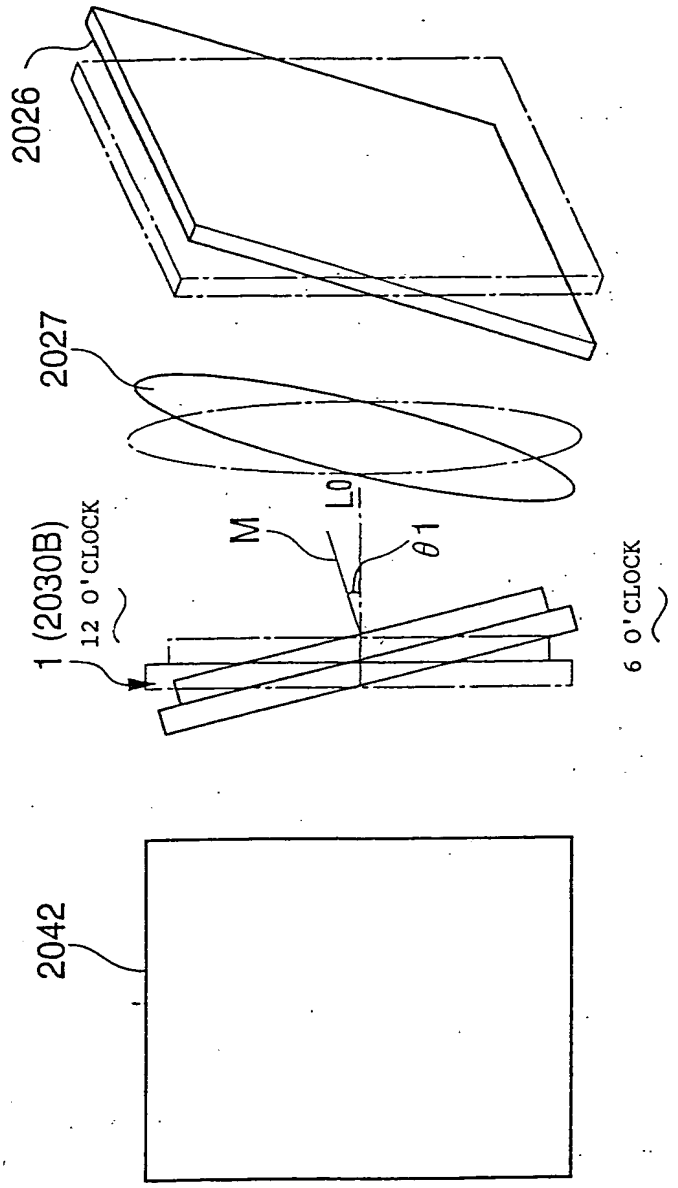


Fig. 27

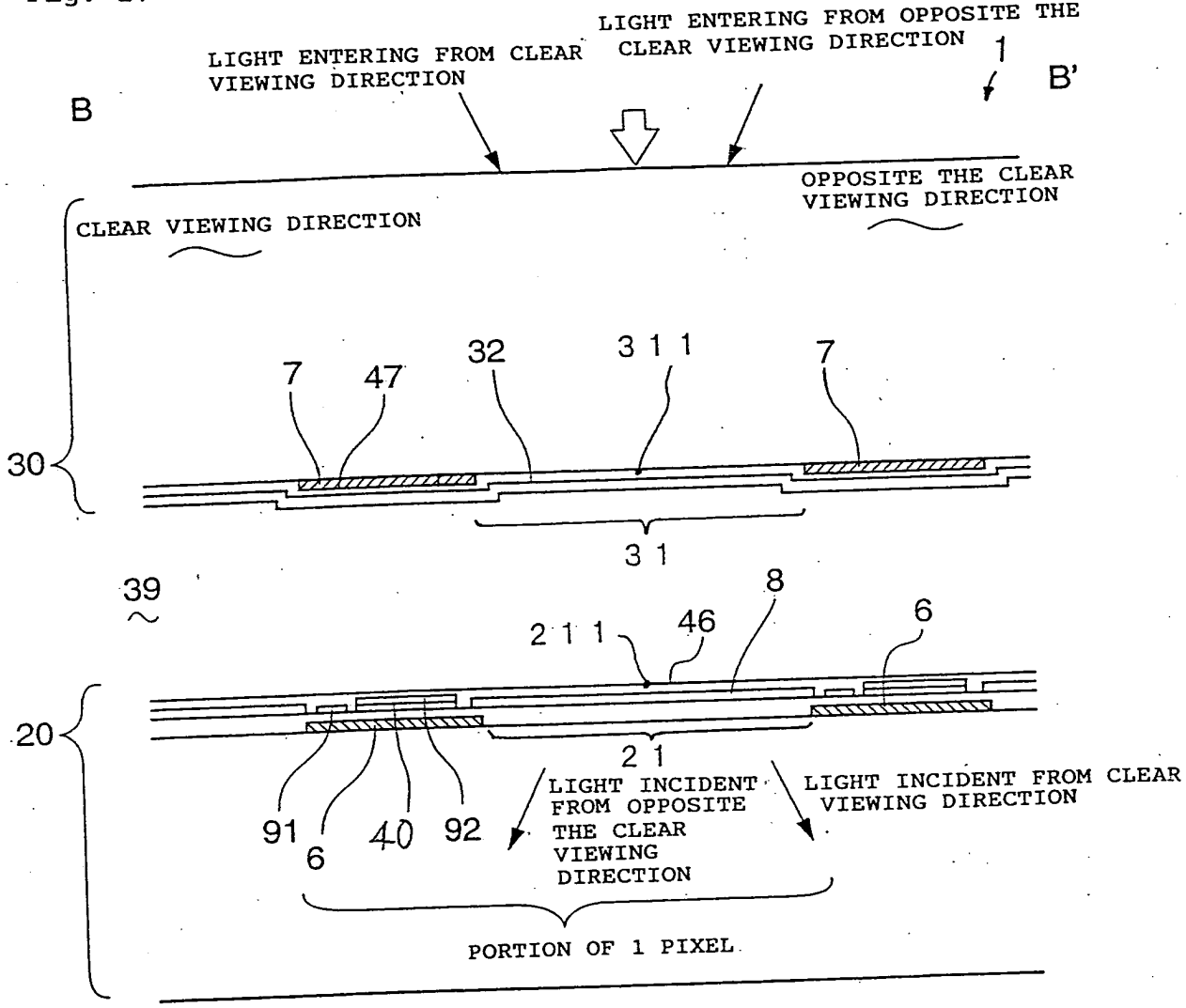

LIGHT ENTERING FROM CLEAR VIEWING DIRECTION
LIGHT ENTERING FROM OPPOSITE THE CLEAR VIEWING DIRECTION
1
B
B'
OPPOSITE THE CLEAR VIEWING DIRECTION
CLEAR VIEWING DIRECTION
7
47
32
311
7
30
31
39
8
211
46
6
20
21
91
6
40
92
LIGHT INCIDENT FROM OPPOSITE THE CLEAR VIEWING DIRECTION
LIGHT INCIDENT FROM CLEAR VIEWING DIRECTION
PORTION OF 1 PIXEL

Fig. 28

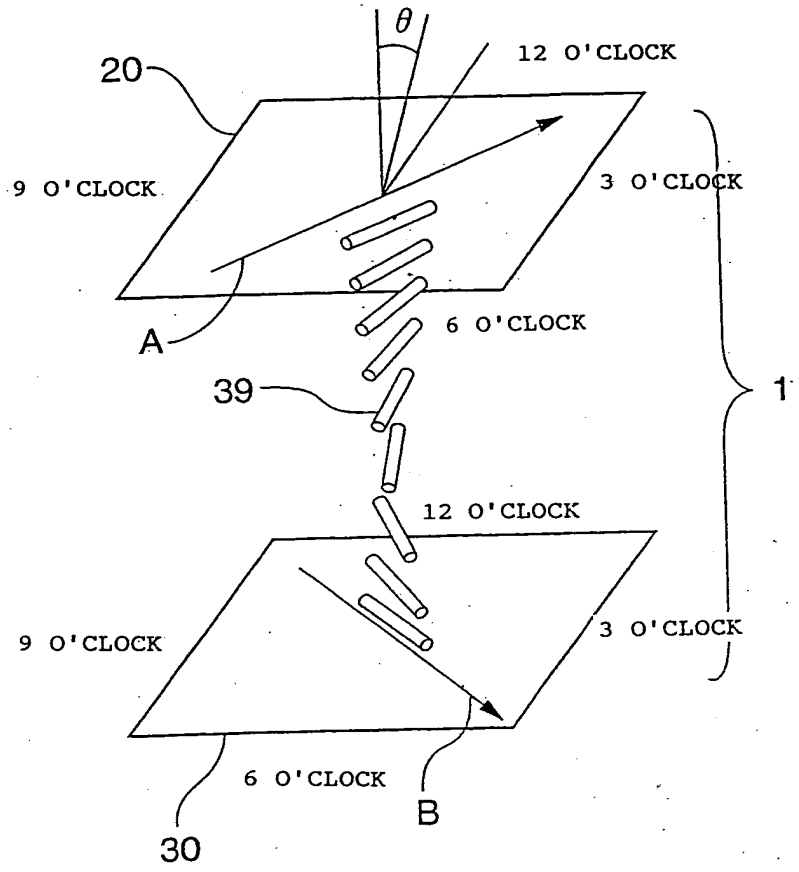

θ
12 O'CLOCK
20
9 O'CLOCK
3 O'CLOCK
6 O'CLOCK
A
39
1
12 O'CLOCK
9 O'CLOCK
3 O'CLOCK
6 O'CLOCK
B
30

Fig. 29

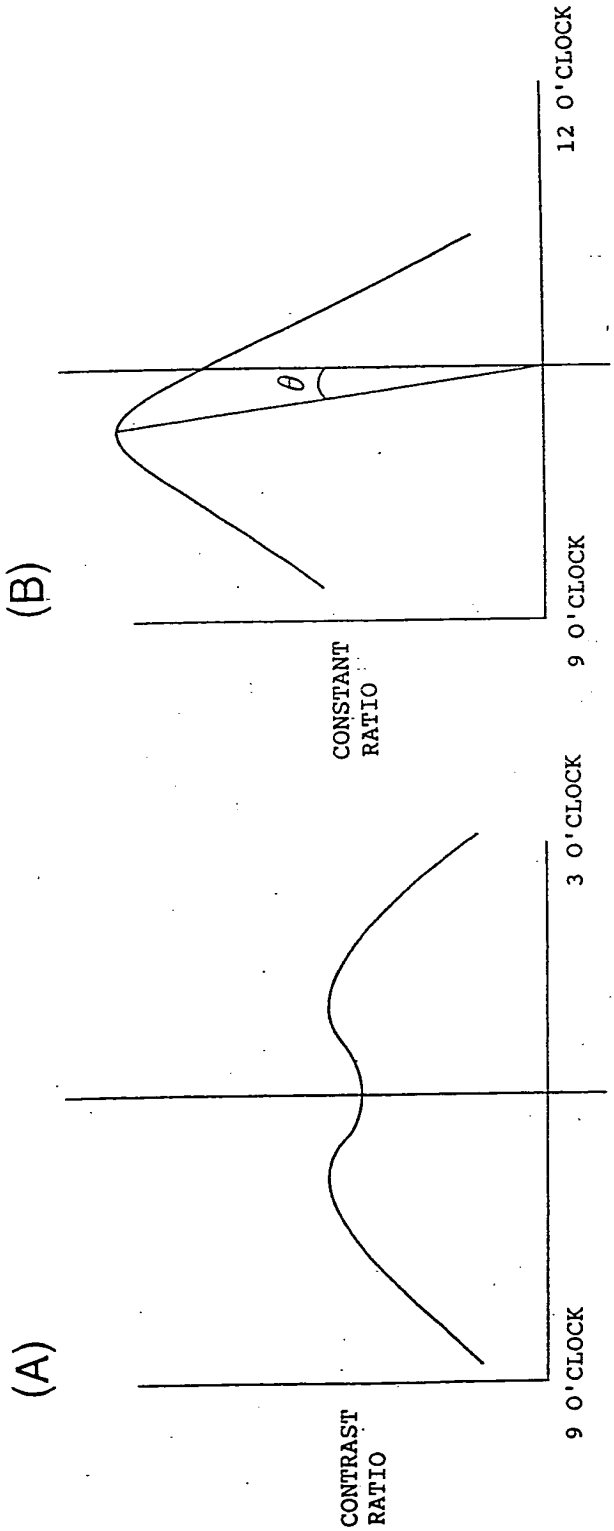
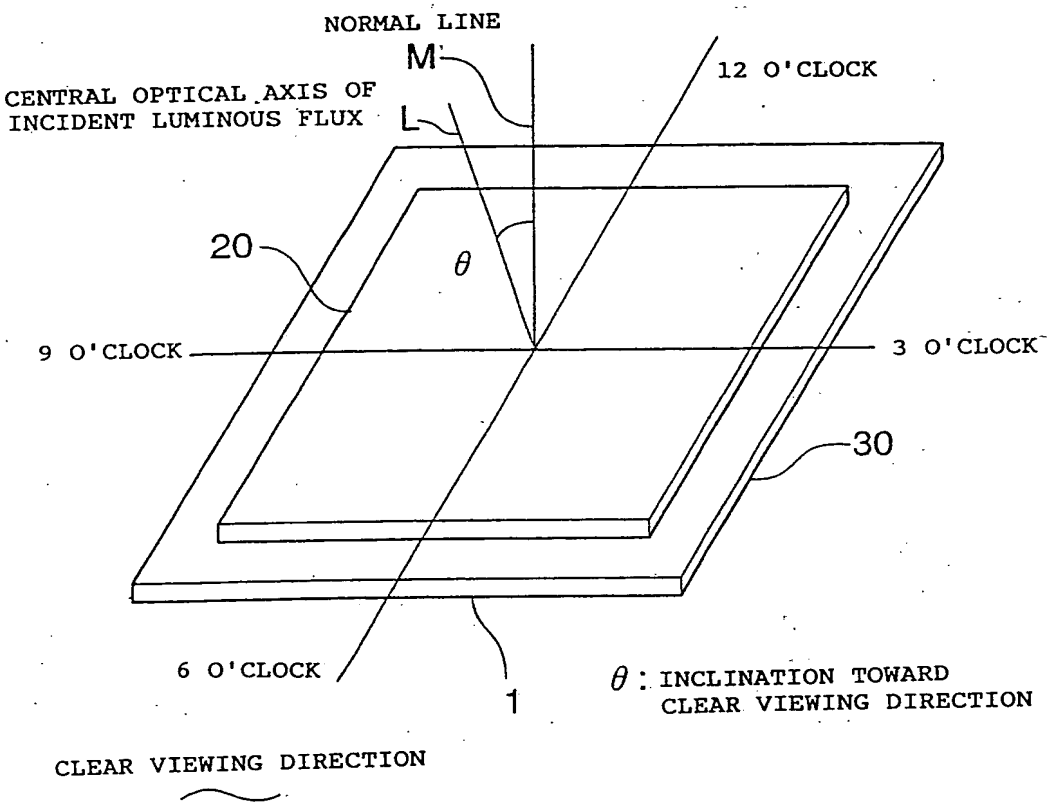

(A)
CONTRAST RATIO
9 O'CLOCK
3 O'CLOCK
(B)
CONSTANT RATIO
9 O'CLOCK
12 O'CLOCK
θ
θ : INCLINATION TOWARD CLEAR VIEWING DIRECTION

Fig. 30


NORMAL LINE
M
12 O'CLOCK
CENTRAL OPTICAL AXIS OF INCIDENT LUMINOUS FLUX
L
20
θ
9 O'CLOCK
3 O'CLOCK
30
6 O'CLOCK
1
θ : INCLINATION TOWARD CLEAR VIEWING DIRECTION
CLEAR VIEWING DIRECTION